OMB Enterprise Architecture Assessment Framework Version 1.5

May 2005

E-GOV

Introduction

Like its predecessor (Version 1.0), Version 1.5 of the Office of Management and Budget (OMB) Enterprise Architecture Assessment Framework is designed to baseline the state of enterprise architecture (EA) across the Federal government. It constitutes a minor upgrade to version 1.0, providing clarifying definitions and criteria and providing better instructions to agencies on how to meet each criterion. In this release, the assessment criteria and scoring methodology remain the same. This updated version simply adds a collection of guidelines and examples to provide additional detail on what types of activities are consistent with satisfying the assessment criteria for each maturity level.

OMB's Assessment Objective

The OMB Enterprise Architecture Assessment Framework is designed to help each agency assess the capability of its EA program. The OMB assessment is intended to help agencies understand the current state of their EAs and discuss with OMB the continuous improvement and integration of the EA into their decision-making process. By proactively applying the assessment, agencies can identify in their EA programs' strengths to sustain, areas requiring improvement, and adjust their plans accordingly. As a result, the positive impact of enterprise architecture on IT investment decision-making will continue to grow stronger.

The OMB assessment looks at the following two capability facets of an agency's EA program:

1. Maturity of the agency's EA, including:
   - EA work product development
   - Capability of the agency's EA program to provide specific investment recommendations as part of the agency's capital planning and investment control (CPIC) process
2. Degree of Alignment, defined as:
   - Alignment with the agency's strategic mission, direction, and plan
   - Reflection of the FEA reference models and principles of good architecture

Assessing Your Agency's EA Capability

Assessment Structure

The Enterprise Architecture Assessment Framework contains four main capability assessment categories. These categories are derived from the CIO Council's *A Practical Guide to Federal Enterprise Architecture* (released February 2001), and are consistent with EA best practices from both government and the private sector.

For each assessment category, an agency can select from six possible levels aligned with specific criteria describing an EA. The assessment value levels range from 0 to 5, where Level 0 = "no evidence presented" and Level 5 = "IT planning is optimized through the EA." Each progressively

higher level encompasses all criteria from the level(s) beneath it. The total for each section is rolled into a final Total Assessment Value.

The four main capability assessment categories are:

- **Change:** Assesses how well the EA facilitates the management of change. Using the specific criteria provided, an agency identifies the level best describing its EA's A) *architectural approach* and B) *strategic direction*.
- **Integration:** Assesses how well the EA ensures the standardization of interfaces, interoperation, information, and connectivity. Using the specific criteria provided, an agency identifies the level best describing its EA's A) *interoperability*, B) *data*, C) *business logic*, and D) *interface*.
- **Convergence:** Assesses how well the EA integrates the agency's IT as defined by the Technical Reference Model (TRM). Using the specific criteria provided, an agency identifies the level best describing its EA's A) *components*, B) *technical platform*, C) *performance*, and D) *security*.
- **Business Alignment:** Assesses how well the EA ensures alignment with the agency's strategic mission, direction, and plan. Using the specific criteria provided, an agency identifies the level best describing its EA's A) *strategic goals* and B) *business target.*

Instructions for Self-Assessment

Enterprise architectures systematically define an organization's current baseline ("As-Is") and target ("To-Be") environments. The following is a list of materials to help an agency complete its assessment and make its EA more effective.

- Agency's current enterprise architecture
- Agency's target enterprise architecture
- EA transition strategy documentation
- Agency and IT strategic plans
- Agency performance plans
- EA governance and program management documents
- Capital planning & investment control (CPIC) documents
- Information from agency EA review board proceedings (charters, minutes, etc.)
- Other EA- and budget-related documentation your agency has developed

Step A. Review the assessment areas and corresponding criteria, guidelines, and examples for each of the four EA review categories included in the EA Assessment Framework to determine the specific EA work product required to best complete this assessment.

Step B. Download the assessment form from http://www.whitehouse.gov/omb/egov/documents/Appendix_A_OMB_Enterprise_Architecture_Assessment_v1.5_FINAL.xls . This form requires Microsoft Excel. At the top of the assessment form, enter 1) the name of your agency or department, 2) the approximate

creation date of the agency EA work products to be assessed, and 3) the assessment date. This assessment form is also available in hard copy in appendix A.

Step C. After reviewing the EA documentation obtained in **Step A**, determine the evaluation criteria statement most accurately describing the documented state of your agency's EA for each assessment area. Use the guidelines and examples documented in appendix B to guide you in selecting the most appropriate evaluation criteria statement. Use the glossary in appendix C to clarify the meaning of terms used throughout the assessment framework.

Step D. In the Assessment Value column, enter the value (0 through 5) of the level corresponding to your selection. ***Important: Only insert the value for the level where you meet ALL criteria outlined.***

Step E. In the Rationale column, add language briefly describing the rationale behind your score selection.

Step F. After you have entered a value and rationale for each assessment area, a Section Value will be calculated. After you have completed this step for each section, a value will be calculated in the Total Assessment Value section of the framework. This Total Assessment Value is your assessment score. Save the Microsoft Excel file for your records and for submittal to OMB.

Step G. Provide the following information to the FEA PMO via e-mail at support@feapmo.gov by May 31, 2005:

i. Your agency point of contact and contact information.

ii. Your EA Assessment using Version 1.5 of the OMB Enterprise Architecture Assessment Framework.

iii. A complete inventory listing of all EA documentation used to complete the May 31, 2005 Assessment.

iv. A copy of all your agency's current EA program documents and artifacts.

Step H. Upon receipt of your materials, the FEA PMO will promptly perform the assessment and will provide the agency with a written feedback report. FEA PMO personnel are available, upon request of the agency CIO or chief architect, to meet with agency personnel to discuss the assessment results in person if needed.

If you have any comments or questions about how to complete, save or submit this assessment, please contact support@feapmo.gov or contact the FEA PMO at (202) 395-0379.

Appendices:

Appendix A: Assessment Form

Appendix B: Guidelines and Examples

Appendix C: Glossary

Appendix A: Assessment Form
OMB Enterprise Architecture Assessment Framework v1.5

Agency:	
Agency EA Date:	
Evaluation Date:	

Change	**Description: Facilitating and managing change to any aspect of the enterprise.**							
	No evidence presented	**EA is initial, informal, and ad-hoc**	**Formal but basic, follows some best practices**	**EA is beginning to be operationalized across the enterprise (i.e. part of transition, CPIC, budget)**	**EA is operationalized and provides performance impact to business operations**	**IT planning is optimized through the EA**	**Assessment Value**	**Rationale**
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**		
A. Architectural Approach	No evidence presented	EA identifies an architectural approach and framework (e.g. Zachman, DODAF, etc)	Key stakeholder business drivers are documented.	The transition strategy describes some portions of the changes needed to transition from current to target; and information value chain model (operational views).	Process for identifying, managing, and closing gaps between target and current state is well documented within the EA.	The EA demonstrates a relationship of the transition, target, and gap closure to investment planning and execution.		
B. Strategic Direction	No evidence presented	EA demonstrates agency head and stakeholder buy-in is documented; EA demonstrates management structure and control is established.	The EA defines an architectural processes and presents a baseline architecture.	The EA defines a target architecture. The EA defines change and risk management strategy or approach.	The EA defines a transition strategy. The EA defines a communications strategy.	The EA demonstrates application of the EA for purposes of creating and maintaining investment programs. The EA demonstrates an implemented process for managing changes and updates to the EA.		
						Section Value	**0.00**	

Integration	Description: Realizing the business rules are consistent across the organization, the data and its use are certain, interfaces and information flow are standardized, and the connectivity and interoperability are managed across the enterprise.							
	No evidence presented	**EA is initial, informal, and ad-hoc**	**Formal but basic, follows some best practices**	**EA is beginning to be operationalized across the enterprise (i.e. part of transition, CPIC, budget)**	**EA is operationalized and provides performance impact to business operations**	**IT planning is optimized through the EA**		
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Assessment Value**	**Rationale**
A. Interoperability	No evidence presented	Interoperability standards are defined at a conceptual basis (list of non-proprietary standards, i.e. patterns, web services, etc).	Interoperability standards are defined at the business function level, and are aligned to the TRM and SRM.	Interoperability standards are defined through patterns and are related to business functions. Business functions are aligned to components and services at the enterprise level.	Interoperability and sharing of information are two of the backbones of the target architecture.	Using common interoperability standards, the EA demonstrates the ability to link and integrate common technologies and business processes.		
B. Data	No evidence presented	Data architecture is broadly defined and not linked to other portions of the architecture.	Data relationships, interdependencies, and definitions are defined at a conceptual level.	Common and defined approach to integrating data with business processes and mission priorities is defined and used throughout the EA.	The target architecture reflects a transition strategy and judgment on the data required for the future state.	EA demonstrates its ability to increase integration and promote the re-use of data within the enterprise and across other agencies (linkage of data to common components, business functions (BRM).		
C. Business Logic	No evidence presented	Standard business processes and rules are broadly defined and conceptual in nature.	Business processes and rules are integrated and described for portions of the architecture.	Business processes and rules are integrated and described throughout all portions of the architecture.	The transition strategy describes the changes required to business processes and rules.	The EA demonstrates the results of viewing common business processes and rules across the enterprise and across other agencies (integrated with the SRM).		
D. Interface	No evidence presented	Interface components and requirements are broadly (conceptually) defined.	Detailed external interface descriptions are contained within the EA.	Some form of a "node" diagram depicts inter-relationships between interfaces and business functions.	Interface descriptions and "node" diagrams are integrated with performance measures. Interfaces are represented at the enterprise and function levels.	The EA demonstrates the establishment of common components integrated through well defined interface requirements.		
						Section Value	**0.00**	

Convergence	Description: Striving toward a standard IT product portfolio as contained in the Technical Reference Model (TRM).							
	No evidence presented	**EA is initial, informal, and ad-hoc**	**Formal but basic, follows some best practices**	**EA is beginning to be operationalized across the enterprise (i.e. part of transition, CPIC, budget)**	**EA is operationalized and provides performance impact to business operations**	**IT planning is optimized through the EA**	**Assessment Value**	**Rationale**
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**		
A. Components	No evidence presented	The EA defines components at a high level of definition.	The EA defines components and shared services throughout the enterprise.	The EA uses services, components, and interoperability relationships to describe portions of the architecture.	The EA is described using services, components, and interoperability relationships through all artifacts and is described across all relationships.	The EA uses services, components, and interoperability relationships to describe transition and investment decision processes and to present a service/component enabled target architecture.		
B. Technical Platform	No evidence presented	EA contains TRM definitions only.	EA defines a high-level linkage to services and technology.	EA defines and integrates TRM with a view of services, allowing patterns to develop.	EA provides an inventory of TRM and services, with a view towards identifying redundant TRM and service components (inter-relationships are described).	EA links all artifacts to TRM and services, and provides the ability to view redundancy across all EA products based on any TRM or service component.		
C. Performance	No evidence presented	EA conceptually defines performance measures.	EA links performance measures to some portions of the architecture segments.	EA defines detailed performance measures and links them to service and technical portions of the architecture.	EA defines detailed performance measures and links them to all technical and service layers of the architecture (clear relationship between performance measures and technical and service layers).	EA defines detailed performance measures, links them to all technical and service layers, and integrates performance measures with transition and investment planning		
D. Security	No evidence presented	Security standards are conceptually defined within the EA.	EA aligns security standards to the TRM.	Security standards are integrated within portions of the components, applications, and technologies.	Security standards are tightly defined within all levels of components, applications, and technologies.	Security standards are tightly defined and are presented as part of the transition planning and investment analysis portions of the EA.		
						Section Value	**0.00**	

Business Alignment	**Description: Ensuring the practices of the enterprise are aligned with strategic management intent.**							
	No evidence presented	**EA is initial, informal, and ad-hoc**	**Formal but basic, follows some best practices**	**EA is beginning to be operationalized across the enterprise (i.e. part of transition, CPIC, budget)**	**EA is operationalized and provides performance impact to business operations**	**IT planning is optimized through the EA**	**Assessment Value**	**Rationale**
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**		
A. Strategic Goals	No evidence presented	EA contains high-level strategic goals for the agency.	EA captures and depicts facts about functions, processes, and linkages/relationships or interdependencies.	Describes and depicts the linkage between internal business components and the achievement of business and customer-centric outcomes.	Establishes manageable and measurable performance objectives and demonstrate improved resource allocation decisions.	Business-IT value chain analysis has been performed (i.e., redundant investments and common business services identified).		
B. Business Target	No evidence presented	The EA defines conceptual target business functions (BRM).	Establishes a common vocabulary for describing the business context of the enterprise.	Describes a business vision linking the business vision to technology and target architecture.	The EA describes comparative determinations of the relative efficiency and effectiveness of investments/programs/ organizations through an alignment analysis.	The EA demonstrates the results or changes to business operations through alignment of investments and programs (i.e. successful implementation of portions of the target architecture).		
						Section Value	**0.00**	

Total Assessment Value:	**0.00**

Appendix B: Guidelines and Examples

This appendix lists guidelines and examples for each assessment criterion. These guidelines and examples provide suggested activities consistent with achieving the maturity level represented by each assessment criterion. They provide an additional level of detail and specificity for resolving any ambiguities present in the assessment criteria.

Agencies should use these guidelines and examples as a checklist to help ensure their EAs meet OMB's standards for maturity and alignment with the FEA. These guidelines are not intended to be prescriptive in nature. OMB recognizes that there are multiple paths available to help agencies achieve the assessment framework's criteria for each level of maturity.

Finally, one note regarding level of completion of an agency EA: a question that comes up frequently is "how much documentation is enough?" The OMB Circular A-130 guidance is that agency EAs should be documented "...at an appropriate level of detail." This translates to a sufficient level of detail to allow agencies to make responsible IT investment decisions and to help the agency achieve its desired results and outcomes. Agencies should develop their EAs with this in mind.

Change - *Facilitating and managing change to any aspect of the enterprise.*

Change: Architectural Approach

Level	Architectural Approach Assessment Criteria
1	**Criterion:** EA identifies an architectural approach and framework (e.g. Zachman, DODAF, etc) **Guidelines and Examples:** At this level of maturity, an agency should select an EA framework to use as a basis of documenting its baseline and target EA. Examples include the TEAF, DODAF, the Zachman framework, and others. An agency can also create a custom EA framework if existing frameworks do not meet its needs. If using a custom framework, an agency should create a reference document to describe this framework at the appropriate level of detail. An agency should also select and implement an EA tool/repository product capable of supporting the framework selected by the agency. This tool should also provide capabilities described in Chapter 4 of the CIO Council's *Practical Guide to Federal Enterprise Architecture*.
2	**Criterion:** Key stakeholder business drivers are documented. **Guidelines and Examples:** At this level of maturity, an agency EA should document business drivers for key stakeholders. "Key stakeholders" can include citizens, businesses, other federal agencies, other government entities (state, local, tribal, and legislative/judicial organizations), and internal stakeholders (e.g., agency head and other executives, business line managers, etc.).
3	**Criterion:** The transition strategy describes some portions of the changes needed to transition from current to target; and information value chain model (operational views). **Guidelines and Examples:** At this level of maturity, an agency EA should describe, at a high level, the process for defining an approach for creating an EA transition strategy. This typically includes processes for performing gap analysis, alternatives analysis, information value chain analysis (i.e., how the agency converts its data into useful information), and the sequencing of projects over time.

Level	Architectural Approach Assessment Criteria
4	**Criterion:** Process for identifying, managing, and closing gaps between target and current state is well documented within the EA. **Guidelines and Examples:** At this level of maturity, an agency EA should provide a detailed description of the process for defining an approach for creating an EA transition strategy. This typically includes detailed information on how the agency intends to transform the transition strategy into actionable sequencing plans to migrate the agency from its baseline to its target architecture.
5	**Criterion:** The EA demonstrates a relationship of the transition, target, and gap closure to investment planning and execution. **Guidelines and Examples:** At this level of maturity, an agency EA should document how its EA transition strategy informs agency investment planning and execution by providing specific investment recommendations as part of the CPIC process. This typically includes the establishment of policies, processes, and procedures for ensuring "line-of-sight" (traceability) between its EA transition strategy and its IT investment portfolio.

Change: Strategic Direction

Level	Strategic Direction Assessment Criteria
1	**Criterion:** EA demonstrates agency head and stakeholder buy-in is documented; EA demonstrates management structure and control is established. **Guidelines and Examples:** At this level of maturity, an agency should document the buy-in and support of key executives, including the agency head and other senior executives in the business units. One way of doing this is to create an Executive Enterprise Architecture policy, per section 3.1.2 of the CIO Council's *Practical Guide to Federal Enterprise Architecture*. An agency should also formally establish an EA program, including the appointment of a Chief Architect and establishment of an EA executive steering committee, an EA Program Management Office (PMO), and other applicable governance boards. This process can include the publishing of an EA Program Management Plan (PMP), updated on an as-needed basis (annual updates are recommended).
2	**Criterion:** The EA defines architectural processes and presents a baseline architecture. **Guidelines and Examples:** At this level of maturity, an agency EA should include a baseline architecture, documenting "as-is" business processes, applications, data descriptions and relationships, technology infrastructure, technical reference model (TRM), and standards profile, per OMB Circular A-130, section 8.b.(2).(b). This baseline architecture should be updated on an as-needed basis (annual updates are recommended). An agency EA also typically includes an EA governance document defining the processes by which the EA program will operate.
3	**Criterion:** The EA defines a target architecture. The EA defines change and risk management strategy or approach. **Guidelines and Examples:** At this level of maturity, an agency EA should include a target architecture reflecting the agency's planned state at a point in time at least two years in the future. The agency should align its target architecture to the agency strategic plan, IT strategic plan, and IT investment portfolio. The agency should also document its change/risk management strategy and approach. An example of how to achieve this is described in the *Practical Guide to Federal Enterprise Architecture* (http://www.cio.gov/archive/bpeaguide.pdf), chapters 3 and 8.

Level	Strategic Direction Assessment Criteria
4	**Criterion:** The EA defines a transition strategy. The EA defines a communications strategy. **Guidelines and Examples:** At this level of maturity, an agency EA should include a transition strategy defining projects, programs, and timelines/milestones to help migrate the agency from its baseline architecture to its target architecture. This transition strategy should include a gap analysis, alternatives analysis, and sequencing plan. Programs and projects defined in the EA transition strategy should align to CPIC initiatives. The agency should also produce a formal EA communications strategy and plan. Chapter 3 of the *Practical Guide to Federal Enterprise Architecture* (http://www.cio.gov/archive/bpeaguide.pdf) provides recommendations on how to achieve this.
5	**Criterion:** The EA demonstrates application of the EA for purposes of creating and maintaining investment programs. The EA demonstrates an implemented process for managing changes and updates to the EA. **Guidelines and Examples:** The agency should be able to provide examples showing how the EA is used to drive the ITIM/CPIC process to identify, create, and maintain investment initiatives for funding. Ideally, all IT investments submitted for funding should be "architected", i.e. aligned with the EA transition strategy. The agency should also implement maintenance/change control procedures for updating the agency EA and maintaining version control thereof.

Integration - *Realizing the business rules are consistent across the organization; the data and their use are certain; interfaces and information flow are standardized; and the connectivity and interoperability are managed across the enterprise.*

Integration: Interoperability

Level	Interoperability Assessment Criteria
1	**Criterion:** Interoperability standards are defined at a conceptual basis (list of non-proprietary standards, i.e. patterns, web services, etc). **Guidelines and Examples:** At this level of maturity, an agency EA should include a standards profile containing a list of interoperability standards currently used at the agency. These interoperability standards should be non-proprietary in nature. Examples of interoperability standards include TCP/IP, HTTP, ISO 23950, etc.
2	**Criterion:** Interoperability standards are defined at the business function level, and are aligned to the TRM and SRM. **Guidelines and Examples:** At this level of maturity, an agency EA should map interoperability standards defined in the agency standards profile to the BRM, TRM, and SRM. The appropriate levels of granularity for mapping are BRM subfunctions, TRM service categories, and SRM service components.
3	**Criterion:** Interoperability standards are defined through patterns and are related to business functions. Business functions are aligned to components and services at the enterprise level. **Guidelines and Examples:** At this level of maturity, an agency EA should define mappings between interoperability standards and specific service components implementing those standards. It should also define mappings between business functions/processes and the service components supporting them. Establishing this traceability between business functions/processes, service components, and interoperability standards results in well-defined patterns. Patterns are frequently occurring combinations of business and technical elements used to deliver reusable business services across the enterprise.

Level	Interoperability Assessment Criteria
4	**Criterion:** Interoperability and sharing of information are two of the backbones of the target architecture. **Guidelines and Examples:** At this level of maturity, an agency target EA should provide capabilities to help enhance and improve interoperability and information sharing. For example, an agency target EA should define elements (components, services, processes, applications, etc.) providing a substantial, enterprise-wide information sharing capability. Examples include message-oriented middleware, SOA (service-oriented architecture) capabilities, search and discovery capabilities, metadata registries, etc.
5	**Criterion:** Using common interoperability standards, the EA demonstrates the ability to link and integrate common technologies and business processes. **Guidelines and Examples:** At this level of maturity, an agency EA should demonstrate tangible results in improving the integration and interoperability of both business processes and technology.

Integration: Data

Level	Data Assessment Criteria
1	**Criterion:** Data architecture is broadly defined and not linked to other portions of the architecture. **Guidelines and Examples:** At this level of maturity, an agency EA should include an enterprise data dictionary. The enterprise data dictionary is a glossary of terms defining entities ("things") important to the agency.
2	**Criterion:** Data relationships, interdependencies, and definitions are defined at a conceptual level. **Guidelines and Examples:** At this level of maturity, an agency EA should document its data using any generally accepted standard of data modeling, such as IDEF1X, UML class modeling, Semantic Web ontology development, subject area taxonomies (ISO/IEC 10000), topic maps (ISO/IEC 13250), and/or ISO/IEC 11179-4.
3	**Criterion:** Common and defined approach to integrating data with business processes and mission priorities is defined and used throughout the EA. **Guidelines and Examples:** At this level of maturity, an agency EA should link its data models to the rest of the enterprise architecture. One way of accomplishing this is to define information exchange between business processes, and data exchange between applications, including sender, receiver, and data element(s) exchanged.
4	**Criterion:** The target architecture reflects a transition strategy and judgment on the data required for the future state. **Guidelines and Examples:** At this level of maturity, an agency target EA should provide a data architecture standardizing the agency on a single, authoritative "vocabulary" to enhance data interoperability. The EA transition strategy should address the issue of updating processes and information systems over time to use this vocabulary.
5	**Criterion:** EA demonstrates its ability to increase integration and promote the re-use of data within the enterprise and across other agencies (linkage of data to common components, business functions/BRM). **Guidelines and Examples:** At this level of maturity, an agency EA should demonstrate evidence of leveraging existing sources of data from other agencies, where appropriate, rather than recreating the data in a duplicative fashion. An agency should document its data models/schemas/vocabularies in a central metadata registry to enhance its discovery and reuse throughout the enterprise. If an agency produces data for cross-agency use, it should publish appropriate metadata to a shared registry (e.g., Core.gov) for use in cross-agency information sharing.

Integration: Business Logic

Level	Business Logic Assessment Criteria
1	**Criterion:** Standard business processes and rules are broadly defined and conceptual in nature. **Guidelines and Examples:** A "business process" is a collection of related, structured activities -- a chain of events -- producing a specific service or product for a particular stakeholder or stakeholder group. A "business rule" is a statement defining or constraining some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business. A business rule dictates what happens when a sequence of inputs is applied to one or more business processes.
2	**Criterion:** Business processes and rules are integrated and described for portions of the architecture. **Guidelines and Examples:** Once an agency defines business processes and rules, it should align them to other portions of the architecture. This provides the "line of sight" (traceability) necessary to perform gap analysis and redundancy analysis. Examples include: aligning business processes to stakeholders and business operating units; aligning business processes to services/applications and/or components supporting them; aligning business processes to applicable information exchange packages and the data elements they encapsulate; etc.
3	**Criterion:** Business processes and rules are integrated and described throughout all portions of the architecture. **Guidelines and Examples:** See level 2 guidelines and examples above.
4	**Criterion:** The transition strategy describes the changes required to business processes and rules. **Guidelines and Examples:** Investments in new technologies frequently provide opportunities for re-engineering business processes to take advantage of efficiencies introduced by those new technologies. An agency EA should document how the EA transition strategy enables appropriate business logic changes over time to leverage new capabilities provided by modernization initiatives. An example of this would be the presence of a BPR initiative in the sequencing plan tied to an associated implementation project.
5	**Criterion:** The EA demonstrates the results of viewing common business processes and rules across the enterprise and across other agencies (integrated with the SRM). **Guidelines and Examples:** At this level of maturity, an agency EA should measurably improve mission performance through its identification and integration of common business processes and rules. Examples include cost savings, cost avoidance, improved quality of service, improved mission performance, etc.

Integration: Interface

Level	Interface Assessment Criteria
1	**Criterion:** Interface components and requirements are broadly (conceptually) defined. **Guidelines and Examples:** At this level of maturity, an agency EA should provide a listing of interface requirements. An "interface" is defined as a connection (planned or actual) between two dissimilar processes, components, services, applications, or devices (or any combination thereof).

Level	Interface Assessment Criteria
2	**Criterion:** Detailed external interface descriptions are contained within the EA. **Guidelines and Examples:** At this level of maturity, an agency EA should provide some type of formal definition/documentation of interfaces. By virtue of the endpoints being dissimilar, an interface will typically include a formal definition of the inputs, communication protocol, outputs, sender, and receiver of the communication. In this assessment criterion, "external" applies to interfaces exposed by elements discretely documented and/or managed by the EA (e.g., a business process, an application, etc.). The agency EA need only document those interfaces for which a documented business requirement exists (as opposed to every interface exposed by a given application, product, etc.).
3	**Criterion:** Some form of a "node" diagram depicts inter-relationships between interfaces and business functions. **Guidelines and Examples:** At this level of maturity, an agency EA should document the alignment of interfaces to the business architecture. One way of doing this is to map interfaces to services, components, and/or applications (for technology interfaces), and agency stakeholders and business processes (for end user interfaces). The agency EA should also provide a view or work product illustrating these relationships graphically (e.g., a UML component diagram, etc.).
4	**Criterion:** Interface descriptions and "node" diagrams are integrated with performance measures. Interfaces are represented at the enterprise and function levels. **Guidelines and Examples:** At this level of maturity, an agency EA should align interfaces with associated performance measures. For example, an interface between system A and system B might be required to achieve an associated latency metric. In another example, an interface between system A and system B directly affects the agency's ability to achieve a program performance measure. The agency EA should also provide a view or work product illustrating this alignment graphically.
5	**Criterion:** The EA demonstrates the establishment of common components integrated through well defined interface requirements. **Guidelines and Examples:** At this level of maturity, an agency EA should result in the implementation of a service-oriented architecture (SOA) providing a layer of reusable components/services available enterprise-wide. This should include well-defined interfaces for accessing these components/services. Specific examples include: a standardized user interface for accessing enterprise-wide services, such as an enterprise information portal; API documentation for reusable software components; and Web Service Description Language (WSDL) interface definitions for XML web services, published to a Universal Description, Discovery, and Integration (UDDI) directory.

Convergence - *Striving toward a standard IT product portfolio as contained in the Technical Reference Model (TRM) and the Service Component Reference Model (SRM).*

Convergence: Components

Level	Components Assessment Criteria
1	**Criterion:** The EA defines components at a high level of definition. **Guidelines and Examples:** At this level of maturity, an agency EA should provide a listing of components with enterprise-wide applicability. A component is a self-contained business process or service with pre-determined functionality exposed through a business or technology interface.

Level	Components Assessment Criteria
2	**Criterion:** The EA defines components and shared services throughout the enterprise. **Guidelines and Examples:** At this level of maturity, an agency EA should define and document components and services with enterprise-wide applicability, using the FEA SRM where possible as a standardized vocabulary for describing commonly used components and services.
3	**Criterion:** The EA uses services, components, and interoperability relationships to describe portions of the architecture. **Guidelines and Examples:** At this level of maturity, an agency EA should align components to other relevant portions of the EA. For example, components should map to the business processes they support; the interfaces used to access them; the applications they enable; the data elements they manage; the technology platforms hosting them; and their IT product dependencies.
4	**Criterion:** The EA is described using services, components, and interoperability relationships through all artifacts and is described across all relationships. **Guidelines and Examples:** See level 3 guidelines and examples above.
5	**Criterion:** The EA uses services, components, and interoperability relationships to describe transition and investment decision processes and to present a service/component enabled target architecture. **Guidelines and Examples:** At this level of maturity, an agency EA should result in the implementation of a service-oriented architecture defining a layer of components and/or services reused by business processes and applications enterprise-wide. Some of the factors helping to accomplish this include: An ability to perform redundancy analysis to identify component reuse opportunities or redundancies; Reusable components available enterprise-wide via a searchable repository; and, if appropriate, leveraging components available federal government-wide via a searchable repository, e.g. Core.gov.

Convergence: Technical Platform

Level	Technical Platform Assessment Criteria
1	**Criterion:** EA contains TRM definitions only. **Guidelines and Examples:** At this level of maturity, an agency EA should document the TRM taxonomy used to categorize agency IT products and standards. The preference is to use the existing FEA TRM. Agencies can customize their TRM taxonomies to match their unique mission needs, but the overall agency TRM still should align to the FEA TRM.
2	**Criterion:** EA defines a high-level linkage to services and technology. **Guidelines and Examples:** At this level of maturity, an agency EA should align its services to its technology. There are many ways of doing this. One way is to align agency applications to both SRM service components and TRM standards/specifications. This will provide high level linkage (line-of-sight) between services and technology.
3	**Criterion:** EA defines and integrates TRM with a view of services, allowing patterns to develop. **Guidelines and Examples:** A "pattern" is a frequently occurring combination of business and technical elements used to deliver re-usable business services across the enterprise. An example of a pattern is the Message Broker pattern, which combines a BRM sub-function (e.g., knowledge dissemination) with SRM service components (e.g., data exchange, information mapping, extraction and transformation, knowledge distribution and delivery) and TRM standards (e.g., database connectivity, data transformation, service description / interface, and service transport) to provide an enterprise capability that is reusable in numerous situations. An agency EA should identify and provide a view of patterns with enterprise-wide applicability.

Level	Technical Platform Assessment Criteria
4	**Criterion:** EA provides an inventory of TRM and services, with a view towards identifying redundant TRM and service components (inter-relationships are described). **Guidelines and Examples:** At this level of maturity, an agency EA should provide a redundancy analysis capability to assist in identifying technical platform redundancies and consolidation opportunities. For example, the presence of many database platforms in the agency might suggest the need to consolidate to fewer database platforms to lower support and licensing costs.
5	**Criterion:** EA links all artifacts to TRM and services, and provides the ability to view redundancy across all EA products based on any TRM or service component. **Guidelines and Examples:** At this level of maturity, an agency EA should provide the ability to create cross-cutting views of the EA on a TRM standard or SRM service component basis.

Convergence: Performance

Level	Performance Assessment Criteria
1	**Criterion:** EA conceptually defines performance measures. **Guidelines and Examples:** At this level of maturity, an agency EA should define performance measures. Normally, the EA team will get this information from the agency and IT strategic plans.
2	**Criterion:** EA links performance measures to some portions of the architecture segments. **Guidelines and Examples:** At this level of maturity, an agency EA should demonstrate a partially complete alignment of performance measures to applicable portions of the EA. Usually at this level, the agency will have linked performance measures to business processes.
3	**Criterion:** EA defines detailed performance measures and links them to service and technical portions of the architecture. **Guidelines and Examples:** At this level, an agency EA should map applicable performance measures to applications, services, and/or service components, and IT products, platforms, and networks.
4	**Criterion:** EA defines detailed performance measures and links them to all technical and service layers of the architecture (clear relationship between performance measures and technical and service layers). **Guidelines and Examples:** At this level, an agency EA should provide clear line-of-sight PRM mapping of metrics from technical and service layers of the architecture to business outcomes.
5	**Criterion:** EA defines detailed performance measures, links them to all technical and service layers, and integrates performance measures with transition and investment planning **Guidelines and Examples:** At this level of maturity, an agency EA transition strategy should capture anticipated performance measure improvement over time for projects defined in the sequencing plan. Each major milestone should show an anticipated performance measure improvement. Also, an agency EA program should evaluate its own performance by capturing actual performance data (e.g., PART scores) and comparing it to anticipated performance measure improvement from the previous year's target EA and transition strategy. An agency EA program should have an approved process for incorporating performance data and "lessons learned" into agency EA planning and CPIC processes. This process should define how performance data is used to revise EA target architecture and transition strategy goals, as well as how budget requests are affected by the achievement (or lack thereof) of stated performance goals from the prior year.

Convergence: Security

Level	Security Assessment Criteria
1	**Criterion:** Security standards are conceptually defined within the EA. **Guidelines and Examples**: At this level of maturity, an agency EA should list the security standards used at the agency. Examples include X.509 PKI, ISO 17799, etc.
2	**Criterion:** EA aligns security standards to the TRM. **Guidelines and Examples:** At this level of maturity, an agency EA should align security standards to the FEA TRM and FEA SRM. Per OMB Circular A-130, section 8.b.2.c.(iii), the agency security standards profile should cover the following services: identification, authentication, and non-repudiation; audit trail creation and analysis; access controls; cryptography management; virus protection; fraud prevention; detection and mitigation; and intrusion prevention and detection.
3	**Criterion:** Security standards are integrated within portions of the components, applications, and technologies. **Guidelines and Examples:** At this level of maturity, an agency EA should map its security standards to the applications, services, and components they support or constrain.
4	**Criterion:** Security standards are tightly defined within all levels of components, applications, technologies. **Guidelines and Examples:** See level 3 guidelines and examples above.
5	**Criterion:** Security standards are tightly defined and are presented as part of the transition planning and investment analysis portions of the EA. **Guidelines and Examples:** Agency IT investment management/governance processes should document how agency stakeholders perform security standards compliance evaluation before an investment is added to the portfolio.

Business Alignment - *Ensuring the practices of the enterprise are aligned with strategic management intent.*

Business Alignment: Strategic Goals

Level	Strategic Goals Assessment Criteria
1	**Criterion:** EA contains high-level strategic goals for the agency. **Guidelines and Examples:** At this level of maturity, an agency EA should reflect the agency strategic vision, goals, objectives, and associated performance measures. These are usually obtained from the agency strategic plan.
2	**Criterion:** EA captures and depicts facts about functions, processes, and linkages/relationships or interdependencies. **Guidelines and Examples:** At this level of maturity, an agency EA should document a business architecture consistent with the agency strategic plan. One way of accomplishing this is to identify applicable subfunctions from the FEA BRM (which represent the agency's business functions), decomposing those subfunctions into business processes, identifying stakeholder participation in those business processes, and stakeholder membership in business operating units.

Level	Strategic Goals Assessment Criteria
3	**Criterion:** Describes and depicts the linkage between internal business components and the achievement of business and customer-centric outcomes. **Guidelines and Examples:** At this level of maturity, an agency EA should provide line-of-sight between business architecture elements and business outcomes from the strategic plan. An example of this would be a report clearly showing the relationships between business processes and activities to the business outcomes from the strategic plan's objectives and performance measures.
4	**Criterion:** Establishes manageable and measurable performance objectives and demonstrates improved resource allocation decisions. **Guidelines and Examples:** At this level of maturity, an agency EA transition strategy should clearly show progress toward achieving the goals (e.g., improvement in the achievement of performance measures) outlined in the strategic plan.
5	**Criterion:** Business-IT value chain analysis has been performed (i.e., redundant investments and common business services identified). **Guidelines and Examples:** Agencies should update their strategic plans and IT strategic plans on a regular basis to reflect value-chain and other analyses performed as part of the agency EA planning process. This includes redundancy analysis identifying redundant investments and/or common services.

Business Alignment: Business Target

Level	Business Target Assessment Criteria
1	**Criterion:** The EA defines conceptual target business functions (BRM). **Guidelines and Examples:** At this level of maturity, an agency EA should list FEA BRM sub-functions pertaining to the agency. These are the agency's "target business functions."
2	**Criterion:** Establishes a common vocabulary for describing the business context of the enterprise. **Guidelines and Examples:** At this level of maturity, an agency EA should provide further detail in describing the agency's business context. Suggested activities include: Decomposing target business functions into business processes and activities; Stakeholder participation in business processes; and stakeholder organization (i.e., business operating units and hierarchy).
3	**Criterion:** Describes a business vision linking the business vision to technology and target architecture. **Guidelines and Examples:** At this level of maturity, an agency EA should provide further detail in linking business needs to technology. Suggested activities include: Documenting IT capabilities (SRM and TRM) needed to support target business processes; Identifying gaps in required IT capabilities, including capabilities not present but needing to be acquired, capabilities present but needing modernization/improvement, and redundant capabilities present but needing to be consolidated; and Identifying redundant business architecture elements (processes, stakeholders, organizations) possibly requiring re-engineering.
4	**Criterion:** The EA describes comparative determinations of the relative efficiency and effectiveness of investments/programs/ organizations through an alignment analysis. **Guidelines and Examples:** At this level of maturity, an agency EA should provide a reporting capability (in the form of an alignment scorecard or similar artifact) comparing IT investments relative to their degree of alignment with elements contained in the agency target EA. This report should quantify the anticipated impact of an IT investment on the agency, relative to its cost.

Level	Business Target Assessment Criteria
5	**Criterion:** The EA demonstrates the results or changes to business operations through alignment of investments and programs (i.e. successful implementation of portions of the target architecture). **Guidelines and Examples:** The agency EA should document the extent of improvement of business operations via the EA transition strategy process. This may include capturing data to describe how well the sequencing plan was executed, such as: how many projects were successfully completed on time and on budget; the actual realization of planned performance gains through successful completion of projects; and the actual amount of money saved or cost avoided through successful completion of projects.

Appendix C: Glossary

The following terms are used throughout the EA Assessment Framework. Definitions for these terms are as follows:

Application: an information system orchestrating and/or aggregating components and/or services to automate a business process.

BPR (Business Process Re-engineering): An approach for redesigning the way work is done in an organization to better support the organization's mission and reduce costs.

Business Function: An ongoing functional capability of an organization sustained over time.

Business Operating Unit: A specific organizational unit supporting an identified set of detailed business functions.

Business Process: A collection of related, structured activities -- a chain of events -- producing a specific service or product for a particular stakeholder or stakeholder group.

Business Rule: A statement defining or constraining some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business. A business rule dictates what happens when a sequence of inputs is applied to one or more well-described Business Processes.

Capability: A system of activities, tangible assets, skills, information bases, managerial systems, and values together creating a special advantage for an organization.

Component: A self-contained business process or service with pre-determined functionality exposed through a business or technology interface.

Core.gov: The Component Organization and Registration Environment. This is an online component registry to promote reuse of various types of components across the federal government. This resource is accessible via the Internet at https://www.core.gov/.

Data Dictionary: A collection of descriptions of the data elements or items in a data model for the benefit of programmers and others who need to refer to them. When developing programs using the data model, a data dictionary can be consulted to understand where a data item fits in the structure, what values it may contain, and basically what the data item means in real-world terms.

Data Element: A basic unit of data having a meaning and distinct units and values.

Information Exchange Package: A set of data elements used to support the sharing of data within a particular business context.

Information Value Chain Model: A set of artifacts within the EA describing how the enterprise converts its data into useful information.

Initiative: A project or program used to implement a new capability or improve an existing capability. Initiatives need time and resource commitments and should be aligned with the organization's strategy.

Interface: A connection between two dissimilar processes, components, services, applications, or devices (or any combination thereof).

Interoperability Standard: A set of rules, requirements, or conditions enabling information systems to operate together. Interoperability standards can address communication protocols and/or hardware,

software, application, and data compatibility. Interoperability standards should be non-proprietary in nature. Examples of interoperability standards include TCP/IP, HTTP, ISO 23950, etc.

IT Product: An off-the-shelf unit of packaged software, hardware, firmware, or combination thereof implementing one or more capabilities defined by the FEA SRM or TRM.

IT Strategic Objective: A measurable IT - related outcome or end state relating directly to one or more of the organization's strategic objectives. IT Strategic objectives typically have one or more associated performance measures.

Laws and Regulations: Mandates established by the Government regulating and constraining an organization's activities.

Location: A fixed geographical place with permanent or semi-permanent facilities used by an organization to conduct business.

Message-Oriented Middleware: Software created to mediate (manage the interaction) between multiple applications across various computing platforms via message-passing mechanisms.

Metadata: Metadata is "data about data." In other words, it is an unambiguous description or definition of the content, context, structure, quality, condition, semantics, and other characteristics of a data element for the purposes of representing the data element to a potential user for discovery and evaluation for potential use, access, transfer, and citation.

Metadata Registry: An information system providing for the storage, cataloging, discovery, management, and retrieval of metadata elements.

Network: The joining of two or more nodes for a specific purpose.

Node Diagram: Diagrams depicting the interdependencies between elements of the architecture. Node diagrams can be used to describe the interaction of business functions with technology components, the relationship of performance objectives to elements of the architecture, and other relationships.

Patterns: Frequently occurring combinations of business and technical elements used to deliver re-usable business services across the enterprise.

Performance Measure: A quantitative measure of the level of performance to be achieved during a period. For example, a standard performance measure for direct labor of two standard hours to complete a task would be combined with the rate per standard hour for labor to create the performance measure of the cost for the task.

Platform: The underlying architecture of hardware and software configurations constituting the computing environment hosting specific services, components, and applications. In its simplest form, a platform constitutes a specific hardware/operating system combination. More complex platforms might include layered operating environments on top of a basic OS/hardware combination, such as a virtual machine, programming language runtime, or application server.

Program: An organizational unit within an agency with responsibility for delivering on a clearly defined mission or service area. Scope of a program may be determined by legislation, executive order, or by organizational structure of the agency to achieve its mission.

Program Manager: A designated lead for a particular program area (project or group of projects) in the Transition Strategy. Has responsibility and accountability for budget and execution of the program and the projects included in that program.

Project: A planned undertaking to implement a solution identified in the Target EA or Transition Strategy.

Shared Services: Architectural elements (business processes and/or technology components) used by multiple organizations within the enterprise.

Service Oriented Architecture: Representation of a system where the functionality is provided as a set of services called by other parts of the system.

Stakeholder: An individual or group with an interest in the success of an organization in delivering intended results and maintaining the viability of the organization's products and services.

Strategic Objective: A measurable outcome or end state relating directly to the agency mission statement. Strategic objectives typically have one or more associated performance measures.

UDDI Directory: A UDDI (Universal description, discovery and integration) directory is an online directory providing businesses and organizations a uniform way to describe their services, discover other organizations ' services and understand the methods required to conduct business with a specific organization.

WSDL: Web services description language is a meta-language used to describe service specifications. WSDL provides interface/implementation details of available web services, and leverages XML to describe data types, details, interface, location and protocols. WSDL specifications are typically published to a UDDI directory to enable service discovery.

XML: A widely used standard from the World Wide Web Consortium (W3C), Extensible Markup Language (XML) is a text markup language for the interchange of structured data between applications.